

**Notice of Allowability**

Application No.

09/769,859

Examiner

Thomas R Artman

Applicant(s)

GROOT ET AL.

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 14 January 2004.
2. ☒ The allowed claim(s) is/are 1-16,21-39,42-60,62-64,66-71 and 73-80.
3. ☒ The drawings filed on 25 January 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 4/16/2003; 11/12/2003
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

### EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Marc M. Wefers on May 3<sup>rd</sup>, 2004.

The application has been amended as follows:

#### IN THE CLAIMS:

Claim 21, line 1, change "20" to -- 1 --

Claim 21, line 2, after the term "on" add -- the --

Claim 22, line 1, change "20" to -- 1 --

#### *Allowable Subject Matter*

Claims 1-16, 21-39, 42-60, 62-64, 66-71 and 73-80 are allowed.

The following is an examiner's statement of reasons for allowance:

The prior art of record neither teaches nor reasonably suggests the method of determining a geometric property of a test object of claims 1, 25 and 76, including:

1) interferometrically profiling a first surface of the test object with respect to a first datum surface,

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2) interferometrically profiling a second surface of the test object with respect to a second datum surface,

3) determining a spatial relationship between the first and second datum surfaces based upon at least one interferometric displacement measurement, and

4) calculating the geometric property based upon the interferometrically profiled surfaces and the spatial relationship.

Claims 2-16, 21-24, 26-39, 74, 75, 77 and 78 are allowed by virtue of their dependency.

The prior art of record neither teaches nor reasonably suggests the apparatus of claim 42, including:

1) an interferometric profiling system that interferometrically profiles a first surface of a test object with respect to a first datum surface and interferometrically profiles a second surface of a test object with respect to a second datum surface different from the first datum surface,

2) an electronic processor coupled to the interferometric profiling system that calculates a geometric property of the test object based upon the interferometrically profiled surfaces and a spatial relationship between the first and second datum surfaces, and

3) a displacement measuring interferometer positioned to measure the spatial relationship between the first and second datum surfaces.

Claims 43 and 60 are allowed by virtue of their dependency.

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The prior art of record neither teaches nor reasonably suggests the apparatus of claim 44, including:

- 1) an interferometric profiling system that interferometrically profiles a first surface of a test object with respect to a first datum surface and interferometrically profiles a second surface of a test object with respect to a second datum surface different from the first datum surface,
- 2) an electronic processor coupled to the interferometric profiling system that calculates a geometric property of the test object based upon the interferometrically profiled surfaces and a spatial relationship between the first and second datum surfaces,
- 3) where the interferometric profiling system has an interferometric optical profiler that has first and second viewing ports for viewing the first and second surfaces, respectively, and
- 4) the first and second surfaces correspond to different sides of a common interface.

Claims 45-47 are allowed by virtue of their dependency.

The prior art of record neither teaches nor reasonably suggests the apparatus of claim 48, including:

- 1) an interferometric profiling system that interferometrically profiles a first surface of a test object with respect to a first datum surface and interferometrically profiles a second surface of a test object with respect to a second datum surface different from the first datum surface,

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2) an electronic processor coupled to the interferometric profiling system that calculates a geometric property of the test object based upon the interferometrically profiled surfaces and a spatial relationship between the first and second datum surfaces,

3) where the interferometric profiling system has an interferometric optical profiler that has first and second viewing ports for viewing the first and second surfaces, respectively, and

4) the optical profiler directs a first portion of the EM radiation towards the first viewing port and directs a second portion of the EM radiation towards the second port, and further directs a third portion of the EM radiation within the optical profiler.

Claims 49-56 are allowed by virtue of their dependency.

The prior art of record neither teaches nor reasonably suggests the apparatus of claim 57, including:

1) an interferometric profiling system that interferometrically profiles a first surface of a test object with respect to a first datum surface and interferometrically profiles a second surface of a test object with respect to a second datum surface different from the first datum surface,

2) an electronic processor coupled to the interferometric profiling system that calculates a geometric property of the test object based upon the interferometrically profiled surfaces and a spatial relationship between the first and second datum surfaces,

3) the interferometric profiling system has a first and second interferometric optical profiler to view the first and second surfaces, respectfully.

Claims 58 and 59 are allowed by virtue of their dependency.

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The prior art of record neither teaches nor reasonably suggests the apparatus of claim 64, including:

- 1) an interferometric profiling system that interferometrically profiles a first surface of a test object with respect to a first datum surface and interferometrically profiles a second surface of a test object with respect to a second datum surface different from the first datum surface,
- 2) an electronic processor coupled to the interferometric profiling system that calculates a geometric property of the test object based upon the interferometrically profiled surfaces and a spatial relationship between the first and second datum surfaces,
- 3) a gauge object having first and second surfaces, where the surfaces are positioned to be profiled by the interferometric profiling system with respect to the first and second datum surfaces, respectfully, and
- 4) where the gauge object is positioned to be in a field of view of the interferometric profiling system during the profiling of the test object.

Claims 62 and 63 are allowed by virtue of their dependency.

The prior art of record neither teaches nor reasonably suggests the apparatus of claim 66 or the method of use of claim 73, including:

- 1) an interferometric profiling system that interferometrically profiles a first surface of a test object with respect to a first datum surface and interferometrically profiles a second surface of a test object with respect to a second datum surface different from the first datum surface,

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2) an electronic processor coupled to the interferometric profiling system that calculates a geometric property of the test object based upon the interferometrically profiled surfaces and a spatial relationship between the first and second datum surfaces, and

3) the electronic processor uses at least one value indicative of phase change on reflection (PCOR) dispersion in the interferometric profiling system and the test object in order to calculate the geometric property.

The prior art of record neither teaches nor reasonably suggests the apparatus of claim 67, including:

1) an interferometric profiling system that interferometrically profiles a first surface of a test object with respect to a first datum surface and interferometrically profiles a second surface of a test object with respect to a second datum surface different from the first datum surface,

2) the interferometric profiling system comprises at least one movable stage for adjusting the position of the first and second datum surfaces,

3) a displacement measuring interferometer positioned to measure a change in a relative position of the first and second datum surfaces caused by the adjustment to the movable stage, and

4) an electronic processor coupled to the interferometric profiling system that calculates a geometric property of the test object based upon the interferometrically profiled surfaces and the relative position between the first and second datum surfaces.

Claims 68-71 are allowed by virtue of their dependency.

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The prior art of record neither teaches nor reasonably suggests the optical profiling system of claim 79, including:

- 1) a broadband source,
- 2) a scanning interferometer that separates input light into a first wavefront and a second wavefront,
- 3) directs the first wavefront along a reference path including a partially reflective surface first surface and a reflective second surface,
- 4) directs the second wavefront along a measurement path contacting a measurement object,
- 5) after (4) above, combines the wavefronts to produce an optical interference pattern, and
- 6) a scanning controller that adjusts the positions of the first and second surfaces.

Claim 80 is allowed by virtue of its dependency.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."




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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R Artman whose telephone number is (571) 272-2485. The examiner can normally be reached on 9am - 6:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas R. Artman  
Patent Examiner  
May 3, 2004



EDWARD J. GLICK  
SUPERVISORY PATENT EXAMINER